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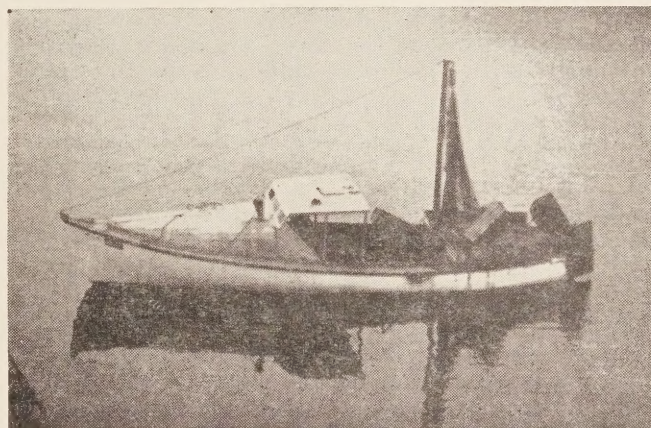
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Inshore Flounder Dragging

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Typical small inshore flounder draggers used in St. Mary bay, 1949:

Left—fully rigged with winch, cables and gallows frames.

Right—Cheaply rigged with adapted pot hauler, ropes and stern posts.

The winter flounder fishery of the Maritimes is a new industry with potentialities for further development. New market outlets, special fishing methods and concentrations of marketable fish are being found, all of which contribute toward increased landings and increased income for inshore fishermen.

High Market Demand

At New England ports, winter flounders* (*Pseudopleuronectes americanus*) are sold as "blackback" when small and "lemon sole" when large (over 2.5 lb.). The average landed price of these flounders in 1948 was higher than that of all other groundfish species, save halibut. The high landed value is indicative of the great demand for this high-quality species. Some winter flounders are marketed as landed but the majority are sold as frozen fillets. Flounders are in great demand as lobster bait and as a result lobster fishermen of western Nova Scotia have taken the greater part of

the spring production by paying a good price. Limited quantities are also purchased by fox farmers. It is apparent then that a lack of markets is not at present limiting the development of the flounder industry.

Fishing Methods — hand line, spear and weir

Hand lines, spears and weirs are familiar devices for catching flounders. Hand-line fishing for flounders from wharves and dories throughout the Maritimes has contributed not only to the family larder but to the enjoyment of both children and adults. In the Argyle-Pubnico area this method has been used extensively by the younger and older fishermen during spring months for the production of flounders as lobster bait. In sandy-bottom, shallow, clear-water areas large numbers have been taken by spear and in some areas, such as St. Mary Bay, small weirs have been used to capture flounders as they move along the shore. None of these methods has proven to be an efficient means of catching flounders. The very small mouths and seasonal fluctuations in feeding of winter flounders limit the efficiency of hook-and-line fishing. The effectiveness of the spear and weir fishing methods is restricted by the ability of flounders to bury themselves, by their limited daily movements and by their seasonal movement offshore.

* Distinguishing features of the six flounders taken in the Maritimes are described in "Flounders of the Maritimes" by W.R. Martin. General Series Circular No. 12.

Otter Trawling or Dragging

An important factor in the development of the winter flounder industry has been the introduction of the otter-trawling method. The Fisheries Research Board has been exploring the potentialities of inshore dragging since 1947. The 40-ft. research boat "Pandalus", rigged with a double-drum winch and 40-ft. flounder drag, has carried out exploratory flounder dragging in inshore waters throughout the Maritimes. The discovery of profitable small-boat dragging in western Nova Scotia has resulted in the recent development of a small commercial fleet of inshore draggers.

Various types of fishing craft have been converted to inshore otter trawling. Scallop draggers have been converted by adding a second drum to the winch and by installing gallows frames for the support of the otter doors. Five scallop boats have been converted in this way since 1948. The majority of the inshore flounder draggers are converted open and Cape Island boats (29 to 42 ft. in length). Some have been completely outfitted with dragger equipment (winch, gallows frames and cables to the net) at considerable expense. Others have reduced the cost of conversion by installing home-made winches. The majority of the inshore flounder draggers, however, have rigged out still more cheaply. In these boats the otter trawl is towed by means of a rope or ropes rather than wire cable. Adapted lobster-pot haulers, with iron or wooden heads, are used to haul the rope and trawl aboard, thus eliminating the need for winches. These are made from car or truck differentials with power take-offs from the engine. In these small draggers the net is normally set and hauled over the stern and the otter boards are attached to stern posts rather than to gallows frames.

Advantages of Flounder Dragging

The otter-trawling method has proven to be much more efficient than hand-line, spear or weir fishing. The reasons may be listed as follows: (1) the gear goes after the fish instead of waiting for them to come to it, (2) a large area of bottom may be swept in a day's fishing, (3) the small mouths of flounders, which limit capture by hook and line, do not restrict capture by otter trawl and (4) buried flounders are readily captured, particularly when a tickler chain is used ahead of the foot rope of the net.

The greatly increased efficiency provided by the otter-trawling method has paved the way for the development of a flounder industry. By means of this fishing method, a new species has become available at a low cost of capture. Flounder dragging provides an additional source of income and does not compete with or replace fishing operations which are traditional to the areas concerned. In St. Mary bay, for example, boats have been used for lobster fishing from December to May and for haddock fishing during June. Some fishermen have

supplemented this fishing by digging clams or by line trawling at the mouth of the bay, but these operations have not contributed an appreciable source of income. Flounder dragging is therefore an additional source of revenue which is available during the summer and fall seasons when other fishing operations are at a minimum. Annapolis and Minas basins offer similar opportunities for the development of flounder dragging.

Consideration of Objections to Flounder Dragging

It appears to be inevitable that fishermen will resist the introduction of a new fishing method. Such has been the case with the development of inshore dragging in western Nova Scotia. The arguments used in opposing dragging have followed the usual lines of attack against otter-trawling; namely, (1) it destroys other species such as lobsters, (2) it destroys large quantities of small fish, (3) it damages the bottom and thus indirectly damages fishing, (4) it destroys fixed and set gear, (5) it breaks up herring and haddock schools. From the discussion presented below it will appear that none of these arguments is sound.

1. Destruction of other species is negligible. The M. V. "K. L. -63", while operating on an experimental license in St. Mary bay, caught over a third of a million pounds of flounders from April to October, 1948. Only about 5% of the landed catch by weight consisted of species other than flounders. Daily reports by the captain showed that only twelve lobsters were taken during the fishing season. These reports were substantiated by the reports of an officer of the Department of Fisheries who accompanied the "K. L. -63" for a number of weeks. The preference of lobsters for rough bottom protects them from dragging which is restricted to smooth-bottom areas. On the basis of observations made to date, wasteful destruction of other species is believed to be very small indeed.

2. The proportion of small fish taken by inshore draggers has been low. Spring catches of flounders by the M. B. "Pandalus" in Annapolis basin and Minas basin contained 9% and 6% by count below the market size of 10 inches. These observations conform with those of Captain Comeau of the "K. L. -63" for St. Mary bay. He reported 5% to 8% culls in spring, 15% to 20% in summer and 4% in autumn. Studies of on- and off-shore movements of flounders at St. Andrews show that there is a differential distribution of flounders according to size. Since small flounders are not found in the same depths as large flounders it follows that they are protected. Small flounders receive further protection by the fact that those taken may be returned to the water apparently unharmed. The majority of those seen on deck are alive and they swim vigorously when returned to the water. The high percentage return of tagged fish which have been so handled indicates good survival. It is apparent then that the available data do not support the view that

flounder dragging damages the stocks by destruction of the young.

3. Destruction of bottom by otter trawls is difficult to assess. It is known that large rocks are dragged up and removed from the fishing grounds. This would result in reduced surface area of bottom and possibly reduced production of small bottom organisms. On the other hand, disturbance by dragging may improve the productiveness of the ground as ploughing does in agriculture. There is no definite evidence that dragging can appreciably alter the productivity of a fishing ground.

4. Destruction of fixed and set gear is not a valid objection to flounder dragging. One of the clauses of the flounder dragging license states that "The fishing operations of the vessel named herein shall not be carried on within one-half mile of boats or vessels fishing with hooks and lines or any stationary fishing apparatus". As long as set gear is clearly marked there should be no problem of interference by draggers. Provision is made for legal action against draggers to obtain compensation for lost gear if interference should occur.

5. It has been claimed that draggers break up schools of fish and thus reduce the catches made by fishermen who depend on the movement of fish to their fixed or set gear. An examination of the available evidence fails to reveal that such catches have been reduced as a direct result of dragging. Until such evidence is produced our inshore communities should not be denied the advantages of dragging.

It is apparent then that the opposition to the operation of inshore draggers is not substantiated by available evidence. The advantages to be gained much more than offset any damage to the fishery which may reasonably be feared. Inshore flounder dragging will add appreciably to the fisheries development of the Maritimes.

Exploration

Exploratory inshore dragging by the Fisheries Research Board of Canada has contributed greatly to the development of this new flounder industry. During 1947 a preliminary survey was made with the M. B. "Pandalus" from Annapolis basin to Cape Breton, N. S., and from Cape Breton to Chaleur bay, N. B. The winter flounder was found to be the most abundant flounder in waters close to shore. In the majority of the areas sampled the average size of the flounders taken was small and only a small proportion was of marketable size. The flounders of western Nova Scotia were of larger size and proved to be faster-growing fish.

In 1948 exploration for concentrations of market-size flounders was limited to western Nova Scotia and in these inshore waters Annapolis basin and St. Mary bay yielded the best returns. The flounders taken in the Tusket to Shelburne area were smaller and few areas suitable for dragging were found. During the year three scallop boats con-

verted to flounder dragging. One fished St. Mary bay, two fished Annapolis basin and all three made good catches.

In 1949 the M. B. "Pandalus" continued exploration for new concentrations of marketable fish in the inshore waters of the Bay of Fundy. The north shore from St. Andrews to Saint John, Scotsman bay and Minas basin were sampled. Although fishing yielded poor returns along the New Brunswick shore, good fishing was found in Minas basin. Growth rate of flounders proved to be rapid and large numbers of marketable fish (14 in. average length) were taken. An extensive area from Kingsport to Cape Blomidon proved to be suitable for dragging but operations were restricted by the very high tides (40 ft.). Indications of good haddock fishing were found in Scotsman bay and Minas basin. On the basis of these results, converted scallop draggers moved into the area and good commercial catches were taken.

The number of inshore flounder draggers increased greatly in 1949. Seven converted scallop draggers and 14 small draggers were operating during the year in western Nova Scotia. Five of the small boats were rigged with cable and winches and nine with rope and adapted lobster-pot haulers.

Research

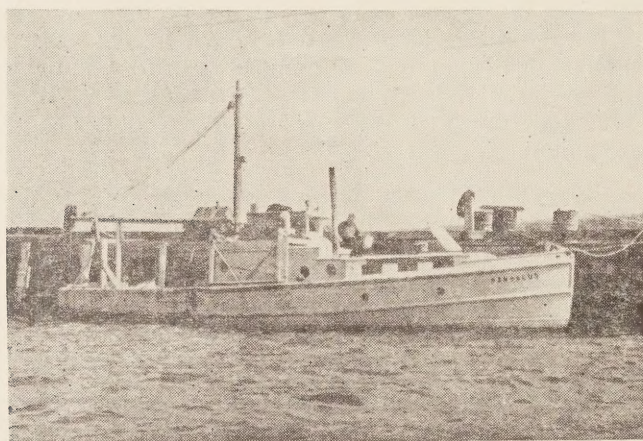
The Fisheries Research Board is following the development of this new industry very closely. These investigations are designed to provide the knowledge necessary for full development and adequate regulation of the fishery.

Exploration for new concentrations of winter flounders will be continued as opportunity permits. The potentialities of a number of areas such as Chignecto bay are as yet unknown.

Investigation of new fishing methods is important to the development of the flounder industry. The relative efficiency of two such methods is being tested by the Fisheries Research Board. Gill nets similar to those used by shore fishermen in Denmark for the capture of flounders may prove useful in the Maritimes. These nets will be used in the Pubnico area in the early spring, when flounders, although present and in good demand by lobster fishermen, are not readily taken by hook and line. In the Danish seining experiments conducted by the Board in 1948-49 large catches of winter flounders have been made. This method may prove to be useful in some smooth-bottom areas.

Mesh experiments will be conducted to determine the effects of different mesh sizes on the catch. It is possible that large meshes will release small fish and bottom invertebrates which are taken in the net. Such trash slows down fishing operations. Large mesh size should also reduce costs of nets. As well as protecting small flounders, efficiency of operations may be improved.

Seasonal fluctuations in availability have been recognized. The best dragger catches have been made in May and June. Fishing drops off in July and August, improves in September and October and drops off again in November. These fluctuations are in part due to the fact that flounders move inshore in spring months and offshore in autumn. Such movements are being studied in detail through regular sampling at different depths with a research boat and through tagging experiments in St. Mary bay. These experiments, which will also give better knowledge of abundance and fishing intensity,

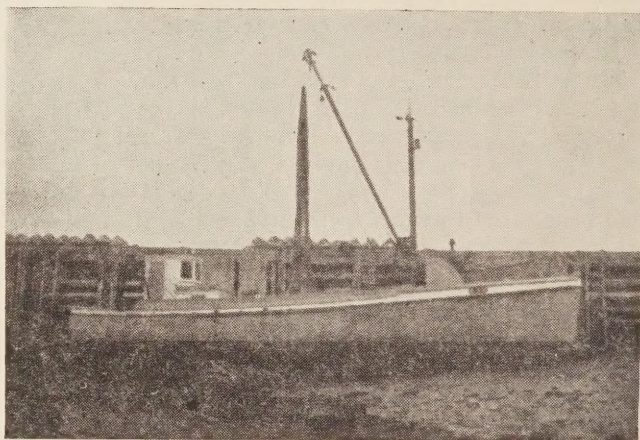


M. B. "Pandalus", Fisheries Research Board boat, used for exploratory flounder dragging, 1947-1949.

depend on the co-operation of fishermen in returning tags with complete information on each recaptured fish.

Changes in size and age composition of the landed catch are being checked regularly in order that any effect of intensive fishing on the stock may be recognized. Growth rate studies have shown that St. Mary bay and Minas basin flounders reach commercial size (10 in.) in three to four years. They average 13 in. or 1 lb. in four years and 16 in. or 2 lb. in six years. Since the commercial catch is quickly replaced by fast-growing young fish, which are for the most part mature by the time they reach commercial size, there appears to be little possibility of endangering the stocks.

Some winter flounders are infected with very small cysts which have been of concern to the industry. These cysts are the intermediate stage in the life history of a flat-worm parasite. Although not harmful to man they detract from the appearance of flounder fillets when abundant. The cysts are common in some areas but unknown in others. Where they do occur infestation is greater in deeper water. Further investigation of this parasite will provide knowledge as to whether or not it can be avoided.



M. V. "K. L-63", converted scallop dragger type, carried out successful experimental commercial flounder dragging in St. Mary bay, 1948.

These various investigations of new concentrations of flounders, relative efficiency of new fishing methods, effect of mesh size, age composition, growth, fishing methods, effect of parasitization, will pave the way for wiser use of the winter flounder resources of the Maritimes.

The good market demand, the development of new fishing methods, the discovery of new concentrations of flounders and the results of biological investigations all show that the potential inshore flounder fishery is as yet only poorly developed.

